Space Weather Forecast

Issued on Tuesday, 04 July 2023 at 01:22 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Minor/Moderate R1/R2 Radio Blackouts likely. Chance of S1/Minor radiation storm throughout the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate, with a Moderate-class flare, originating from a sunspot region in the southeast quadrant. There are currently seven sunspot regions on the Earth-facing disc. The largest and most magnetically complex is a sunspot region located in the northwest quadrant, which will continue to rotate towards the limb in the coming days. This region did produce an X-flare on 02 July, although no coronal mass ejection (CME) followed this event. There are two other reasonably sized sunspots regions in the southeast quadrant, which are close together, which have produced numerous Common-class flares. The remaining sunspot regions on the visible disc are relatively small and stable. No Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind parameters indicate the waning weak connection to a coronal hole fast wind, with wind speeds declining from around 430 km/s to 360 km/s. The Interplanetary Magnetic Field was weak throughout, while the north-south component varied weakly. Geomagnetic activity was Quiet (Kp 1-2).

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate activity is likely, with a slight chance of further Strong flares. The risk is mostly coming from the large sunspot in the northwest, but potentially also from the smaller sunspots in the southeast.

Solar Wind / Geomagnetic Activity: A CME associated with a Moderate-class flare on 29 Jun may include an Earth-directed component. Any glancing arrival at Earth would be expected early on day 1 (04 July), but it is considered more likely to miss. Solar winds are expected to be slow or slightly elevated through the period, with a slight enhancement possible from a small coronal hole on days 1 and 2 (04/05 July), although this is low confidence. Meanwhile, the next coronal hole currently located in the east is likely to connect with Earth on day 4 (07 July).

Geomagnetic activity is expected to be mostly Quiet to Unsettled, with only a slight chance of Active or Minor Geomagnetic Storm conditions on 03 or 04 July should we see any possible glancing CME impact or weak coronal hole high speed stream. Another enhancement in geomagnetic activity is likely on day 4 (07 July) as the next coronal hole fast wind arrives at Earth.

Energetic Particles / Solar Radiation: The solar radiation has a slight chance of reaching the S1/Minor Storm threshold throughout the period.

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Met Office Space Weather Forecast

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	5	1	1	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	50	40	30
Very Active	R3 to R5 X	No	15	10	10	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	15	10	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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